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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/509,869	04/07/2005	Pierre A. Beaudry	9-15186-21US	4985

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EXAMINER

LEACH, CRYSTAL I

ART UNIT	PAPER NUMBER
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3737

MAIL DATE	DELIVERY MODE
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10/02/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/509,869	Applicant(s) BEAUDRY ET AL.	
	Examiner CRYSTAL I. LEACH	Art Unit 3737	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 October 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10/1/2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>10/1/2004</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Information Disclosure Statement

1. The Information Disclosure Statements (IDS) submitted on November 1, 2004 is in compliance with 37 CFR 1.97 and 1.98. The references therein have been considered.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 9 and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Ntziachristos et al. (6,615,063).

4. Regarding claims 1, 9, and 18, Ntziachristos et al. teach a method of imaging internal structures of a highly turbid medium (see abstract and col. 10, l. 47-53), the method comprising steps of: imaging the internal structures at each one of a set of at least two predetermined wavelengths (see col. 2, l. 43-67; col. 3, l. 43-54; col. 12, l. 56 – vol. 13, l. 10) to generate a corresponding set of respective images; and merging the set of images to generate a corresponding fused image (see col. 4, l. 66—col. 5, l. 6 and col. 5, l. 10-15 and col. 7, l. 20-23).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 2-6 and 10-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ntziachristos et al. (6,615,063) in view of Ntziachristos et al. (US 2004/0015062).

Ntziachristos et al. ('063) teach utilizing a CCD camera (see col. 3, l. 43-54 and col. 10, l. 34-43). Ntziachristos et al. ('063) teach that the each of the predetermined

wavelengths is selected based on optical absorption properties of at least one internal structure of turbid media (see col. 3, l. 43-54; col. 3, l. 58 – col. 4, l. 5; col. 25, l. 32-50).

It would also be obvious to one of ordinary skill in the art to select wavelengths based on optical absorption properties of the structure desired to be imaged or analyzed in order to ensure optimal visualization of the region under investigation. Ntziachristos et al. ('063) teach displaying an optical molecular map wherein an administered fluorophore may be visualized (see col. 3, l. 58-63, col. 5, l. 34-40; col. 7, l. 35-38 and l. 65 -col. 8, l. 34; col. 10, l. 10-30) and teach that the display device can be a cathode ray tube, other video display or other image display system (see col. 15, l. 15-17).

Therefore, it would be obvious to one of ordinary skill in the art that the system of Ntziachristos et al. ('063) is capable of rendering each image in a respective different primary display color on a color display monitor by either altering the settings on the display device of choice or by the selection of specific fluorochromes. Ntziachristos et al. ('063) teach simultaneously displaying images (see col. 2, l. 64-67), subtracting rendered images (see col. 2, l. 67 – col. 3, l. 15 and col. 4, l. 17-37; col. 25, l. 32-50).

There are a finite number of ways to perform image fusion. It would therefore be

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obvious to one of ordinary skill in the art to try any one of those methods, including averaging rendered images, or substitute one method for another in order to achieve predictable solution of obtaining a registered image. Ntziachristos et al. ('063) teach wherein the tissue sample is breast tissue, and the set of predetermined wavelengths comprises any one or more of: 755, 800, 930 and 975 nm (see col. 12, l. 56-67 and col. 25, l. 55-57).

Ntziachristos et al. ('063) do not explicitly teach that the step of imaging the internal structures is based on temporal point spread function (TPSF) analysis of light emerging from the turbid medium.

In the same field of endeavor, Ntziachristos et al. ('062) teach an embodiment wherein photon pulses are directed into a patient and the arrival of photons emitted from the patient is time-resolved using a time-gated intensified CCD camera (ICCD) (see para. [0021]). Examiner notes that TPSF may be generated by using a time-gated intensified CCD camera (see Long et al. 6,992,762, col. 7, l. 4-5) and that it would therefore be obvious to one of ordinary skill in the art that the invention of Ntziachristos et al. ('062) would be capable of imaging internal structures based on TPSF.

It would be obvious to one of ordinary skill in the art to substitute the CCD camera of Ntziachristos et al. ('063) for the ICCD camera of Ntziachristos et al. ('062) in order to offer an alternative means for detection.

7. Claims 2-6 and 10-15 are also rejected under 35 U.S.C. 103(a) as being unpatentable over Ntziachristos et al. (6,615,063) in view of Chen et al. (US 2003/0065268).

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Ntziachristos et al. ('063) teach utilizing a CCD camera (see col. 3, l. 43-54 and col. 10, l. 34-43). Ntziachristos et al. ('063) teach that the each of the predetermined wavelengths is selected based on optical absorption properties of at least one internal structure of turbid media (see col. 3, l. 43-54; col. 3, l. 58 – col. 4, l. 5; col. 25, l. 32-50). It would also be obvious to one of ordinary skill in the art to select wavelengths based on optical absorption properties of the structure desired to be imaged or analyzed in order to ensure optimal visualization of the region under investigation. Ntziachristos et al. ('063) teach displaying an optical molecular map wherein an administered fluorophore may be visualized (see col. 3, l. 58-63, col. 5, l. 34-40; col. 7, l. 35-38 and l. 65 -col. 8, l. 34; col. 10, l. 10-30) and teach that the display device can be a cathode ray tube, other video display or other image display system (see col. 15, l. 15-17). Therefore, it would be obvious to one of ordinary skill in the art that the system of Ntziachristos et al. ('063) is capable of rendering each image in a respective different primary display color on a color display monitor by either altering the settings on the display device of choice or by the selection of specific fluorochromes. Ntziachristos et al. ('063) teach simultaneously displaying images (see col. 2, l. 64-67), subtracting rendered images (see col. 2, l. 67 – col. 3, l. 15 and col. 4, l. 17-37; col. 25, l. 32-50). There are a finite number of ways to perform image fusion. It would therefore be obvious to one of ordinary skill in the art to try any one of those methods, including averaging rendered images, or substitute one method for another in order to achieve predictable solution of obtaining a registered image. Ntziachristos et al. ('063) teach wherein the tissue sample is breast tissue, and the set of predetermined wavelengths

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comprises any one or more of: 755, 800, 930 and 975 nm (see col. 12, l. 56-67 and col. 25, l. 55-57).

Ntziachristos et al. ('063) do not explicitly teach that the step of imaging the internal structures is based on temporal point spread function (TPSF) analysis of light emerging from the turbid medium.

In a similar field of endeavor, Chen et al. teach utilizing a TPSF to reconstruct an image (see para. [0010]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include utilization of a TPSF in the invention of Ntziachristos et al. ('063), in light of the teaching of Chen et al., in order to improve image reconstruction.

8. Claims 7, 8, 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ntziachristos et al. (6,615,063) in view of Ntziachristos et al. (US 2004/0015062) and further in view of Smith (6,631,204) or further in view of Martens et al. (5,983,251).

Ntziachristos et al. ('063) in view of Ntziachristos et al. ('062) do not explicitly teach calculating a KL transform of each image to generate respective transformed images; selecting at most three of the transformed images based on a respective energy of each image.

Smith teaches calculating a KL transform of each image to generate respective transformed images (see col. 2, l. 5-18).

Martens et al. also disclose the known technique of calculating a KL transform of each image to generate respective transformed images (see col. 2, l. 6-50).

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It would have been obvious to one of ordinary skill in the art at the time of the invention to include a method of calculating KL transforms of each image in the invention of Ntziachristos et al. ('063) in view of Ntziachristos et al. ('062), in light of the teachings of either Smith or Martens et al., in order to enhance detection of differences in the reconstructed images of the turbid media under investigation.

9. Claims 7, 8, 16 and 17 are also rejected under 35 U.S.C. 103(a) as being unpatentable over Ntziachristos et al. (6,615,063) in view of Chen et al. (US 2003/0065268) and further in view of Smith (6,631,204) or further in view of Martens et al. (5,983,251).

Ntziachristos et al. ('063) in view of Chen et al. do not explicitly teach calculating a KL transform of each image to generate respective transformed images; selecting at most three of the transformed images based on a respective energy of each image.

Smith teaches calculating a KL transform of each image to generate respective transformed images (see col. 2, l. 5-18).

Martens et al. also disclose the known technique of calculating a KL transform of each image to generate respective transformed images (see col. 2, l. 6-50).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include a method of calculating KL transforms of each image in the invention of Ntziachristos et al. ('063) in view of Chen et al., in light of the teachings of either Smith or Martens et al., in order to enhance detection of differences in the reconstructed images of the turbid media under investigation.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kaufman et al. (7,194,117) teach a system and method for performing a three-dimensional virtual examination of objects such as internal organs; Carroll (4,515,165) teaches an apparatus and method for detecting tumors.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CRYSTAL I. LEACH whose telephone number is (571)272-5211. The examiner can normally be reached on Monday through Friday, 8 am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Casler can be reached on 571-272-4956. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/BRIAN CASLER/

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Supervisory Patent Examiner, Art
Unit 3737

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Examiner, Art Unit 3737